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Class : XI   *Chemistry*

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Two Marks & Three Marks

1.   How to write balanced stiochio metric equation?

In the skeleton equation, the numbers and kinds of particles present are equal in the both sides of arrow $BaCl_2 + Na_2 SO_4 \rightarrow BaSO_4 + 2NaCl$

2.   Define molecular formula.

Molecular formula obtained by multiply the Empirical formula with 'n' whole numbers in Empirical formula.

Molecular formula   = Empirical formula x n

                       $= C_2H_4O$ x 2

                       $= C_4H_8O_2$
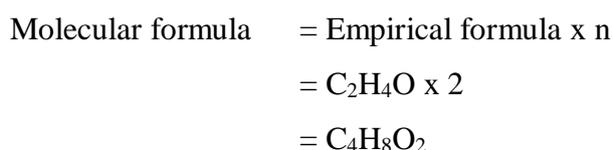
3.   What is meant by oxidation state.

Residual charge of atom. Which its Atom has when all other atom from the molecule are removed as ions.

The value maybe (+) (-) (0)

4.   Define Avogadro's number (N_A)

The number of atoms in 12g of sample carbon – 12.

Its value 6.023×10^{23}.

5.   Define oxidizing agent

Oxidising agent :- Substance decrease in oxidation number

reducing agent :- Substance increase in oxidation number.

$MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

6.   What is meant by oxidation and Reduction.

Oxidation : Addition of O_2 (or) removal of H_2.

Reduction : Addition of H_2 (or) removal of O_2.

Oxidation : Loses of one (or) more electrons. Increase the positive charge on atom

Reduction : Gain of one (or) more electrons. Increase the negative charge on atom

          $H_2S + Cl_2 \rightarrow 2HCl + S$
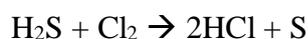
7.   Molecular formula?

It is the multiples of its empirical formula.

8.   State empirical formula.

It is the formula of substance written with smaller integer "Subscripts". Example: Na_2CO_3

9.   Define stoichiometry equation.

Short scientific representation of chemical reaction.

Relation between number of moles of reactants and products in chemical reaction.

10.   Normality = 'N'

$$= \frac{Weight\ of\ solute\ (gm)}{equivalent\ weight\ of\ solute} \times \frac{1}{Volume\ of\ solution\ (lit)}$$

Definition of Normality

The number of grams equivalents of the solute dissolved per lit of the solution.

11.   Molality:- 'm'

$$= \frac{Weight\ of\ solute\ (gm)}{Molecular\ weight\ of\ solute} \times \frac{1}{Weight\ of\ solvent\ (kg)}$$

Definition of Molality

The number of grams moles at solute dissolved in 1000gm (or) 1kg of the solvent.

12.   Molarity : 'M'

$$= \frac{Weight\ of\ solute\ (gm)}{Molecular\ weight\ of\ solute} \times \frac{1}{Volume\ of\ solution}$$

Definition of Molarity

The number of grams moles of solute dissolved in per lit at solution.

13.   Equivalent mass of acid.

$$= \frac{Molar\ mass\ of\ the\ acid}{Number\ of\ replaceble\ Hydrogen\ atom}$$ reducing agent.

*   **Equivalent mass of Base.**

$$= \frac{Molar\ mass\ of\ base}{Number\ of\ replaceble\ hydroxyl\ ions}$$

Equivalent weight of Reducing agent.

*   The number of parts by mass of reducing agent which is completely axidised by 8 parts by mass of O_2

2. Metallurgy

1.   **Define ore and mineral.**

         Mineral:-

*   It is Natural material

*   It contains metal (or) their compounds in earth's crust.

         Ore:-

*   Mineral contain sufficient amount of metal

*   It can be profitably and readily separated on commercial scale.

2.   Define mining :- The process of taking out ores from earth crust is called mining.

3.   What are the elements, high abundance on ocean Na, Mg, Cl_2, Br_2.

4.   What are concentration methods?

*   Gravity separation process (or) hydraulic washing.

*   Froth floation process.

*   Electromagnetic separation process.

*   Chemical method.

5.   **Define froth flotation process**

*   Sulphide are partiles are only moistened by oil oxide, gangure are only moistened by water by using oil separate the ore from impunities.

*   Pine oil used as foaming agent.

6.   **Explain mond's process.**

*   Impure metal heated with CO.

*   Carbonyl compound is formed.

*   Decomposed the carbonyl compound get pure metal.

        $Ni + 4CO \rightarrow Ni(CO)_4 \rightarrow Ni+4CO$.

7.   **What is meant by Anode mud.**

*   The insoluble impurities either dissolved in Electrolyte (or) fall at the bottom is called anode mud.

8.   **Write about smelting – reduction.**

*   It is reduction method.

*   Metal oxide converted into metal.

*   Seperation of metal (or) its sulphide mixture from its ore in fused state called smelting.

9.   **Define calcination**

*   It is Oxidation method.

*   Ore convered into metal oxide.

*   Ore is subjected to high temperature in absence of air.

*   Below its M. Point.

                $CaCO_3 \rightarrow CaO + CO_2 \uparrow$

10.   **Define roasting**

*   It is Oxidation method.

*   Ore to its oxides.

*   Remove volatile oxide impurities.

        SO_2, AS_2O_3

3. Atomic Structure

1.   **Define atomic particles.**

*   Electron, proton, neutron.

2.   **Define Atomic number $\propto$ mass number**

*   The total number of electrons (or) protons is called Atomic number (z)

*   The total number nucleons is termed as mass number (A) of atom

3.   **What is defect of Rutherford model**

*   Failed to explain stability of atom.

* Failed to explain existence of certain definite lines in hydrogen spectrum.

4.   Define orbital, quantum number.

* Orbital:- More chance of finding the electron near the nucleus.

Quantum number:-

* Orbital's designated by set of numbers.

* It required to locate an electron in an atom.

5.   What are orbitals are stable

* Completely filled and Half filled orbitals are more stable.

* Hence more energy is needed to remove an electron from atom.

6.   Define Aufbau principle, Hunds rule and paulis exclusion principle

* "In the ground state of atoms, the orbitals are filled in order of their increasing energies."

* No pairing occurs until all orbitals of a given sub – level are half filled.

* "It is impossible for any two electrons in given atoms to have all the four quantum numbers identical"

7.   How to calculate the number of neutron.

* Mass number – atomic number = Neutron.

$_{11}Na^{23}$ =   23-11=12

4. Periodic Classification

1.   Define s, p, d, f block elements.

S – Block Elements

* First Group element (alkali) 2nd group element (alkaline earthmetal).

* Out most electronic configuration nS^1 and nS^2

P – Block Elements

* It contain from 13th group to 18th group

* outer most electronic configuration $nS^2 nP^1$ to $nS^2 nP^6$

D – Block Elements

* Its outermost electronic configuration $(n-1) d^{1-10} ns^{1-2}$

The e^- filled in d orbital

* It contain from 3rd group to 12th group.

F – Block Elements

* It contain Lanthanoids and actinoids.

* Its outermost electronic configuration $(n-2)^{f-14} (n-1) d^{0-10} ns^2$.

* The e- are filled in f orbital

2.   Define metalloids

* Periodic table show properties that are characteristic of both metals and non – metal.

* These elements are called semi – metals (or) metalloids.

3.   **What are the transuranium elements.**

*   Many of actinoid elements have be made only in nano gram quantities (or) less by Nuclear reaction.

*   The elements coming after uranium are called transuranium.

*   This elements chemistry not fully studied.

4.   **Write about actinoides and Lanthanoide series.**

*   It is placed in sixth period (n = 6). Contain 32 elements.

*   The electrons enter 6s, 4f, 5d, 6p orbital's.

*   Filling up 4f orbital from cerium to lutetium.

It is place in 7th period (n = 7).

* The electron enters 7s, 5f, 6d, 7p

* Most radio active element.

5.   **Define Ionisation energy**

*   The amount of energy required to remove an electron from an atom is knowns Ionisation energy

Atom + Energy $\rightarrow$ positive ion + electron.

6.   **Write about electro negativity**

*   The tendency of an atom in a molecule attract the electro pair towars itsself.

Period $\rightarrow$ increase from left to right.

Group $\rightarrow$ decrease from up to down.

7.   **Define electron affinity.**

*   Amount of energy is liberated when adding one electron to gaseous atom.

$Atom_{(g)}$ + electron $\rightarrow$ $Anion_{(g)}$ + energy

$Cl_{(g)} + e^- \rightarrow Cl_{(g)}$ + energy.

8.   **Write any 3 difference between electron gain enthalphy and electro negativity.**

Electron gain enthalpy	Electro negativity
Definition	Definition
Unit KJ / mole Kcal / mole	No units
It does not change regulary in a period (or) group	It changes regulary in a period (or) a group

9.   **What are factors affecting I.E**

1.   Size of atom

2.   Charge on the nucleus

3.   Screening effect of inner electron

4.   Penetration of effect of electron

5.   Effect of Half filled (or) Completely filled sub – levels.

5. 1S – Block Elements

1.   What are the isotobes of Hydroge

1.   Protium   * Normal Hydrogen

                  * Mass number one.

                  * 99.984% available in nature

      Deuterium   * $_1H^2$ (or) $_1D^2$

                  * Approximate ratio

                  * D : H ~ 1 : 6000

      Tritium   * $_1H^3$ (or) $_1T^3$

                  * Radio active, Half life of ~ 12.3 years.

2.   Give the uses of deuterium.

*   Study of chemical reactions mechanism

*   Used in artificial radioactivity.

*   Used as moderator.

3.   Explain ortho para Hydrogen.

*   If the proton of H – atom spin same direction – ortho hydrogen.

*   If the proton of H – atom spin opposite direction – para Hydrogen.

4.   How will you convert para into ortho hydrogen.

*   By treatment with catalyst Pt (or) Fe

*   By electrical discharge

*   By heating 800°C (or) more

*   By mixing Nascent hydrogen.

5.   What is meant by heavy water.

*   It is also called deuterium oxide.

*   The oxides of heavy hydrogen (deuterium)

*   Fromula D_2O.

6.   Give the uses of heavy water.

*   Used as moderator.

*   Study of reaction in living organism

*   Preparation deuterium

7. H_2O_2 is powerfull reducing agent why?

*   It is power full reducing agent.

*   Moist silver oxide reduced to silver

$$Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$$

8.   Write the uses of Hydrogen peroxide.

*   It is used as oxidizing agent.

*   It is used as propellant in rocket.

*   Used as antiseptic and germicide.

*   Used as Bleaching agent (hair, wool etc)

9.   What are the characteristics of alkali metal.

    * Shiny white and soft.

    * Readily cut with knife.

    * The last metal of this group, francium radio active.

    * Highly reactive.

10.   Why the alkalimetals are good reducing agent.

    * It has low ionization energy.

    * Easily lose their valance electrons

    * So it behave good reducing agent.

11.   When the sodium react with Hg. (or) Na give the reaction?

    When the sodium heated with Hg, sodium form amalgam of varying composition Na_2Hg, Na_3Hg

12.   Uses of Na and Li

    * Used to prepare sodium peroxide, NaCN.

    * Sodium amalgam used as reducing agent.

    * Act as catalyst.

7. P-Block Element

1.   What is the Nature of Halides.

    * B-Block contain metal and Non metal.

    * In period left to Right $\rightarrow$ Ionic character decreases

    * In group Top to bottom $\rightarrow$ covalent character increases.

    * Polarisabity depends upon the size.

2.   What is meant by borax.

    * Sodium tetra borate $Na_2B_4O_7$

    * Tincal a crude form of borax contain 55% of it and is found in the land dried up lakes of Tibet.

3.   Give the uses of borax?

    * Food preservative.

    * Manufacture of glass, soap.

    * Cleaning and dyeing agent in tanneries.

4.   Give the structure of Diamond.

    * In diamond C – C linkage are covalent.

* Each corn atom linked with four neighboring carbon atom.

* Tetrahedral arrangement of atom.

* High M.P. and B.Point.

5.   What are the allotropic forms of carbon?

* Diamond

* Graphite

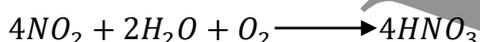* Amorphous carbon Example:- Coke, Bone black, Carbon Black

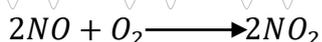**6.   Explain important point of fullerens?**

* Most symmetrical family.

* Contain 60 atoms and 32 sides.

* (20 hexagone and 12 pentagones)

* The group of spherical carbon.

* It has super conducting properties.

7.   Give uses of carbon and its compound?

* Used as fossil fuels.

* Refrigerants, fire extinguishers.

* Make viscose rayon and cellophane.

8.   Explain the manufacture of Nitric acid by ostwalds process

$$4NH_3 \xrightarrow[1155k]{Pt\ gauzo} 4NO + 6H_2O$$

$$2NO + O_2 \longrightarrow 2NO_2$$

$$4NO_2 + 2H_2O + O_2 \longrightarrow 4HNO_3$$

Nitric acid concentrated by distillation.

9.   Give the importance of oxygen

* It is used for resipiration by both animals and plants

* It is essential for life

* Hence molecular oxygen act as cell fuel

10.   Give the uses of ozone.

* It is used as germicide and disinfectant

* It is used as Bleaching oil, starch etc

* It is used to manufacture of artificial silk and synthetic camphor.

6. 2S-Block Element

1.   Explain the metallic character of 2S block elements.

* It harder than alkaline earth metal

* Hardness increase with decrease in atomic number

* It has high thermal and electrical conductivity

2. **Why the 2S Black elements are called alkaline earthmetal.**

The 2S block elements oxides. Produce alkaline solution in water. So it is called alkaline earth metal.

3. **What are the ore of magnesium in nature**

1. Magnesite $MgCO_3$ 2. Dolomite $MgCO_3$, $CaCO_3$

3. Epsom salt $MgSO_4$, $7H_2O$ 4. Carnalite $MgCl_2$ $KCl.6H_2O$

4. **What is meant by Epsom salt $\propto$ How it is prepared**

* It is magnesium sulphate $MgSO_4$ $7H_2O$

* $MgO + H_2SO_4 \rightarrow MgSO_4 + H_2O$

5. **Give the uses of epsum salt.**

* Used as purgative

* Used in dyeing and tanning process

* Platinised $MgSO_4$ used as catalyst.

6. **Write the preparation method of calcium oxide (or) (Quick lime)**

* Buring limestone in specially designed kilns

$CaCO_3 \xrightarrow{1070K} CaO + CO_2$

7. **Give the properties of quick lime**

* With Cl_2 give bleaching powder $CaOCl_2$ H_2O

* White porous solid

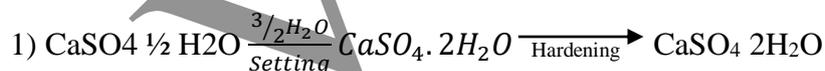* With CO_2 form $CaCO_3$

* With SO_2 form calcium sulphite

8. **Write shorts notes on plaster of paris and its uses.**

* Gypsum is heated to about 393K it loses 1½ molecules of water.

* The process of setting takes place intwo steps.

1) $CaSO4$ ½ $H2O \xrightarrow[Setting]{^3/_2 H_2O} CaSO_4.2H_2O \xrightarrow{Hardening} CaSO_4$ $2H_2O$

Uses:-

* In surgery for plastering the fractured bones

* In making moulds for statues

* In making false ceilings

8. Solid State

1. **Define crystalline solids amorphous solid.**

* Atoms are arranged in regular

* Three dimensional pottern

* Rigid in compressible

   Amorphous solid

* No regular arrament

* Have no definite geometrical forms
* Imcompressible to certain extent

2.   What is micro crystalline.

* Some crystals are so small
*. It can be recognized by only powerfull microscope
*. It is called microcrystalline

3.   Give how many characteristic feature of crystals

(i) Face   (ii) Form   (iii) Edge   (iv) Interfacial angle

4.   Define the unit cell.

The smallest structure of which the crystalline solid is built by its repetition in three dimension called as unit cell.

5.   What are the characteristic parameter of unit cell?

* <u>Crystallographic axes.</u>
* The lines drawn parallel to the lines of intersection of any three faces of the unit cell
* Donot lie in same plane
* <u>Interfacial angles:-</u>
* The angles between the three crystallographic axes.
* <u>Primitives:-</u> The three side a, b, c of unit cell.

6.   How many types of crystal classes of unit cell?

* 7 seven classes
* Cubic   * Triclinic   * Monoclinic   * Orthorhombic   * Tetragonal

   * Hexagonal   * Rhombohedral

7.   Explain about BCC and FCC cubic unit cell?

* Each corner contain one atom
* There is an atom center of six face.
* Each Fcc corner contain one atom
* There is an additional atom in centre of unit cell

8.   How many number of unit cell canbe shared by body, face, edge, corner.

* Body center atom shared by one unit cell
* Face center atom shared by six unit cell
* Edge center atom shared by Twelve unit cell
* Corner atom shared by eight unit cell

9.   How to calculate the number of Na and Cl in NaCl unit cell.

$\frac{N_{ed}}{4} + \frac{N_b}{1} + \frac{N_f}{2} + \frac{N_c}{8}$

$12 \times \frac{1}{4} + 1 \times 1 = 3 + 1 = 4$ sodium ion for chloride ions

8 x (1/8) + 6 x (1/2) = 1 + 3 = 4 chloride

10. **Explain about miller indices.**

*   Taking the reciprocals of weiss indices and multiplying throught by smallest number in order to make all the reciprocals as intergers obtain the miller indices of plane

*   Denoted by h, k, l

*   The value positive (or) negative (or) zero

9. Gaseous State

1. **What are the laws used in gaseous State**

Boyleslaw

The pressure (P) is inversely proportional to its volume (V) at constant (T)

P $\propto \frac{1}{V}$ (cat constant pressure)

Charles law

At constant pressure volume is directionaly proportional to absolute Temperature (T)

V $\propto$ T (or) $\frac{V}{T}$ = constant

At constant volume. The pressure is directional proportional = 0 absolute Temperature T.

P $\propto$ T (or) $\frac{P}{T}$ = constant

2. **How to derive the ideal gas equation**

Boyles law P $\propto \frac{1}{V}$ …………... (1)

Charles law P $\propto$ T …………... (2)

Combine **1** and **2** equation

P $\propto \frac{P}{T}$ (or) PV $\propto$ T

/ PV = RT

R – is proportionality constant

Idea gas equation

    PV = nRT 'n' number of moles of gas.

3. **Define STP**

The gas system present at

Standard temperature = 273K

Standard pressure = 1.013 x 10^5 Nm^{-2} (1 atm)

The gas constant R depends upon different units of pressure and volume.

4. **Explain about Graham's law of diffusion, effusion diffusion.**

"Under the same condition of Temperature and pressure the rate of diffusion of different gases are inversely proportional to the square roots of their molecular masses"

$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$

Effusion.

The gas escape into low pressure by pin Cole

$$\frac{Effusion\ rate\ of\ gas\ Gas\ 1}{Effusion\ rate\ of\ gas\ Gas\ 2} = \sqrt{\frac{M_2}{M_1}}$$

5.   **Write the significance of vanderwalls constant a, b**

* $\frac{a}{V^2}$ is measure the attractive force of molecules. It is also called <u>cohesion pressure</u> (or) <u>internal pressure</u>

*   Inversion Temperature of gas can be expressed $T_i = \frac{2a}{Rb}$

*   Used to calculate critical constant of gas.

6.   **What are the limitation of vanderwaals equation.**

*   It could not explain the quantitative aspect of deviation

       It only explain the qualitative aspect of P, V deviation.

*   The value of a and b are also found to vary with P and T such variation are not considered.

*   Critical constant value devialed from original values determined by other experiment.

7.   **Define Tc, Pc, and Vc**

       T_c (Critical Temperature)

*   At particular temperature when increase the in pressure brings in liquefaction occurs.

*   Above which no liquefaction occur although the pressure increased.

       P_c (Critical Pressure)

*   The minimum pressure is required to liquefy 1 mole of gas at critical temperature.

       V_c (Critical Volume)

*   1 mole of gas occupied volume at T_C and P_C

8.   **What is meant Joule – Thomson effect**

*   When the gas allowed Adiabatically from region of Higher Pressure into region of Low pressure.

9.   **Explain the inversion Temperature (Ti)**

*   The Teperature in fall. When the gas expand adiabatically into region higher pressure into. Low pressure by porous plug called inversion Temperature.

10.   **What are the condition of liquefication of gase.**

*   Based on concept of critical temperature followed by compression.

*   Based on Joule Thomson effect

*   Adiabatic demagnetization.

10. Chemical Bonding

1.   **Define chemical Bond.**

*   Strong force of Binding between low (or) many atoms is referred as chemical bond.

2.   **What are the classification molecules.**

*   Homonuclear diatomic molecule → Molecules have two identical atom N_2

     Heteronuclear diatomic molecules → Molecules have two different atom HCl

*   Homonuclear polyatomic molecule: Molecule have 2 (or) more identical atoms S_8

     Heteronuclear polyatomic molecule: Molecule have 2 (or) more different atom HCHO

3.   **How many types of chemical bonding.**

*   Ionic (or) electrovalent bond

*   Covalent bond

*   Co-ordinate covalent bond.

4.   **Explain about ionic bond.**

*   The electrostatic attraction between positive and negative ions.

     Excises:- NaCl

     Covalent bond

*   Mutal sharing of electron between bonded atom Ex:H_2 Co-ordinate covalent bond (or) dative bond.

*   The bond thus formed is between the dorar and acceptor atom Ex: NH_3

5.   **What is mean by lattice enthalphy.**

*   The energy is require to completely separate one mole of ionic compound into gaseous constituent ions.

6.   **Define Hess's law.**

*   Enthalphy change of reaction same at constant V and P whether it takes place in single (or) multiple step.

*   The initial reactants and final products are same.

7.   **What are the important features of lattice enthalphy are**

*   More stable ionic compound have greater lattice enthalphy.

*   Higher charge and smaller radii ion have greater lattice enthalphy

*   Lattice enthalphy attest the solubilities of ionic compound.

8.   **Give any three properties of ionic compound.**

*   High M. Point ∝ high B. Point

*   Soluble in dielectric solvent like water

*   Poor conductor in solid state

     Good conductor in molten state

9.   **Give any three characteristics of covalent compound**

*   Mutual sharing of electrons.

*   Low M. Point ∝ high B. Point

*   Donot conduct electricity in molten state

10. Explain about fajans rule (polarization)

*   Greater polarization of anion in molecule. More is covalent character in it this is fajans rule

11. Difference between sigma and Pi – bond.

S.No.	Sigma Bond	Pi – bond
	Overlapping of S – S (or) S – O orbital (or) P – P orbital along intern clear axis.	Side wise overlapping of P orbital
	It is strong	It is weak

12. Define Hybridisation.

Same energy of atomic orbitals combines to form equal number of hybrid orbitals. With same energy, shape etc. The phenomenon is hybridization

13. Define Resonance.

Number of structure with similar energy, position of nuclei, bonding and non bonding pair of electrons are considered to Represend the structure Each structure called resonance.

Ex: O_3 have 3 resonance structure.

11. Colligative Properties

1. What is meant by colligative properties.

*   Property of solution depends purely on the number of particles dissolved in it.

*   Rather than the Chemical Nature of particle.

2. What are the colligative properties.

*   Lowering of vapour pressure of solvent (ΔP)

*   Elevation of Boiling point of solvent (ΔT_b)

*   Depression of freezing point of solvent (ΔT_f)

*   Osmotic pressure (T_1)

3. State Raoult law.

*   The lowering of vapour pressure is defind as the ratio of the lowering vapour of solution to vapour pressure of pure solvent.

$$\frac{P - P^\circ}{P^\circ} = x_2$$

4.   **Define K_f and K_p**

    K_f

*   Depression in freezing point produced when one mole of solute is dissolved in 1kg solvent.

*   It is also the depression in freezing point of one molal solution.

*   Another Name cryoscopic constant (or) molal freezing point depression constant.

    K_p

*   The elevation of boiling point of one molal solution.

*   Ebullioscopic constant (or) molal Boiling point elevation constant.

*   Abnormal solute undergo dissociation (or) association in a given salt.

5.   **Explain osmosis in solution.**

*   Spontaneous movement of solvent particles from a dilute solution to concentrated solution.

*   Through a semipermiable membrane is known as osmosis.

6.   **What are the characteriftics of osmotic pressure π?**

*   It is minimum external pressure which must be applied on the solution side in order to prevent the osmosis.

*   A solution having lower (or) higher osmotic pressure than the other said to the hypotonic (or) hypertonic respectively.

*   Two solution of different substance having same osmotic pressure at same temperature said to be isotonic to each other. They are known as isotonic.

7.   **What are law used in osmotic pressure**

*   Boyles – Vant hoft law.

    The osmotic pressure T_1 is directly proportional to the concentration of the solution at constant T.

    $\pi \propto C$ T constant

*   Charle's – Vant holf law.

    The osmotic pressure π is directly proportional to the temperature at constant concentration

    $\pi \propto T$ C constant

    $\pi = C R T$ R - gas constant

8.   **What are the Advantage of Bearkley – Hartley method.**

*   Direct and quick method for recording osmotic pressure.

*   There is no – change in concentration of solution during the measurement of osmotic pressure.

*   The osmotic pressure is balanced by external pressure and there is minimum strain on semi permeable membrane.

9.   **Write about abnormal colligative propertiy?**

    Experiment value of colligative property differ widely from those obtained theortically

10.   **Explain the vant Hoft factor.**

    For dissociation.

$$i = \frac{Experimental\ colligative\ property}{Normal\ colligative\ property}$$

i > 1 for dissociation

$\propto$ dissociation $= \left(\frac{i-1}{n-1}\right)$

For Association

$$i = \frac{Experimental\ colligative\ property}{Normal\ colligative\ property}$$

i < 1 for Association

$\propto$ Association $= \frac{(1-i)_n}{(n-1)}$

12. Thermodynamics

1.   Explain the terminology used in thermodynamics.

system

*   Any porton of matter under consideration.

*   Which is separated from the rest of universe

Surrounding:-

*   Everthing in the universe that is not part of the system and interact with it is called as surrounding.

2.   Types of Systems:-

1. Isolated system   2. Closed system   3. Open system   4. Homogeneous system

5. Heterogeneous system

3.   What are the macroscopic properties

*   The properties which are associated with bulk (or) macro scopic state of system such as

P, V, T, etc……………..

4.   Define extensive and Intensive property.

*   The properties that depend on the mass (or) size of system.

*   Example: Volume, mass etc.

*   The properties that independ on the mass (or) size of system.

*   Example:- Density, temperature etc.

5.   What are the state function.

*   The variable used to describe the state of system called state function.

*   Example: P, V, T

6.   What are the thermodynamic process.

(i) Isothermal process   (ii) Adiabatic process   (iii) Isobaric process

(iv) Iso choric process   (v) Cyclic process   (vi) Spontaneus process

(vii) Non spontaneous process   (viii) Reversible process

(ix) Irreversible

7.   Difference between reversible and irreversible process

Reversible Process	Irreversible Process
* Takes place forwad (or) Back ward direction	Takes place in one direction only
* Slow process	It takes place in measurable speed
* Driving force is small	Detinite driving force is required.

8.   Differentiate about exothermic and enothermic process

Endothermic Process	Exothermic Process
* Absorption of heat	Evolution of heat
* Final state of system higher energy initial state of system lower nergy	Final state of system lower energy Initial state of system higher energy
* Physical transformation take place	Physical transformation take place.
Example: Melting of ice.	Example: Forming ice.

9.   Define path path function?

*   Thermodynamic property of the system whose value depends on the path.

Example: Heat (q) work (w)

10.   Define zeroth law of thermodynamics.

"If the two system at different temperatures are separately in thermal equilibrium with third one, then they tend to be thermal equdibrium with themselves.

11.   Define work, heat, energy terms.

Work

Force multiplied by distance of displacement (S)

W = F.S.

Heat :

*   It is form of energy.

*   Algebaric quantity

*   It is path function and is not a state function

Energy is

*   Capacity to do the work

*   State function

*   Extensive property

*   Unit 'J' (or) KJ

12.   Define enthalpy "Q" and Explain it characteristics

H is defind as. Sum of internal energy "u" of the system and product of pressure and volume of the system.

$$H = u + PV$$

Characteristics

*   It depends on state function

*   But it is path function

*   Known by the term "heat content"

13.   Explain about the enthalphy of neutralization

*   Complete neutralization of one gram – equivalent amount of strong acid by a gram – equivalent amount of strong Base under fully ionized state in dilute conditions.

13. Chemical Equilibrium

1.   What are equilibrium reactions?

*   Reaction which never proceed to completion in both forward and back ward direction are called as equilibrium reaction.

2.   Write a note on characteristics of chemical equilibrium

*   Constantancy of concentration.

*   Equilibrium canbe initiated from either side.

*   Equilibrium can't be attained in an open vessel

*   Catalyst donot alter the equilibrium.

3.   What is the law of mass action.

"The rate of chemical reaction is proportional to the active masses of the reactants"

4.   Define degree of dissociation?

*   Total molecules that actually dissociate into simpler molecules x

*   It has no unit.

5.   What are characteristics of Equilibrium constant.

* K_p and K donot depent on the initial concentration of reactant only depends on equilibrium concentration values.

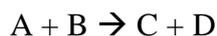* K_{eq} volue donot change in presence of catalyst.

* $K_{eq} \propto T$

* $K_p \propto \frac{1}{P}$

14. Chemical Kinetics

1.   **How will you express rate of reaction.**

Change in the concentration of any reactant (or) product in reaction per unit time.

A + B → C + D

Rate of reaction

       = Rate of disappearance of A

       = Rate of disappearance of B

       = Rate of appearance of C

       = Rate of appearance of D

2.   **What are factors influencing reaction rates**

*   Nature of reactants and products

*   Temperature of the system

*   Presence of catalyst

*   Surface area of reactants.

3.   **State rate law**

The rate of reaction is proportional to the product of initial concentration of all the reactants with each. Concentration raised to certain exponential power

Rate $\propto [A]^P \ [B]^q$

Rate = K $[A]^P \ [B]^q$

K is proportionality constant

4.   **Define order of the reaction.**

Order of reaction is defind as the sum of exponential powers to which each concentration is raised in rate expression.

Rate : = K $[A]^P \ [B]^q$

5.   **Explain "Molecularity" of reaction?**

Molecularity is defind as number of atom (or) molecules taking part in an elimentary step leading to chemical reaction.

6.   **Differentiate order and molecularity of reaction.**

| Order of reaction	Molecularity of reaction
* It is experimental volue	* It is theortical concept
* May have negative value	* Never negative value
* Value zero, fractional (or) integer	* Volue neither be zero nor fractional

7.   **What is meant by rate determining step?**

*   In multistep reaction the experimentally determined rate correspond to the rate of the slowest step.

*   Thus the step which has the lowest rate value among the other step of reaction is called rate determining step (or) rate limiting step.

8.   **Define "Zero order" reaction with unit K。**

The concentration of reactant does not affect the reaction rate is called as zero order of reaction.

$$K = \frac{[A]_\circ - [A]_t}{t}$$

$$H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$$
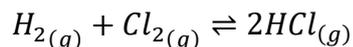
9.   **Explain 1st, 2nd order with unit K_1 K_2.**

A reaction said to be first order if its rate is determined by one concentration term.

$$K = \frac{2.303}{t} \log \frac{V_\infty}{V_\infty - V_t} Sec^{-1}$$

A reaction said to be second order if its rate is determined by two concentration term.

$$K = \frac{1}{t}\left[\frac{x}{a(a-x)}\right] \text{ lit mol}^{-1} \text{ sec}^{-1}$$

10.   **Define half life period.**

$$t\frac{1}{2} = \frac{0.693}{K_\circ}$$

It is the time required to reduce the concentration of reactant to half of its initial value.

*** All the Best ***

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